FIG.1

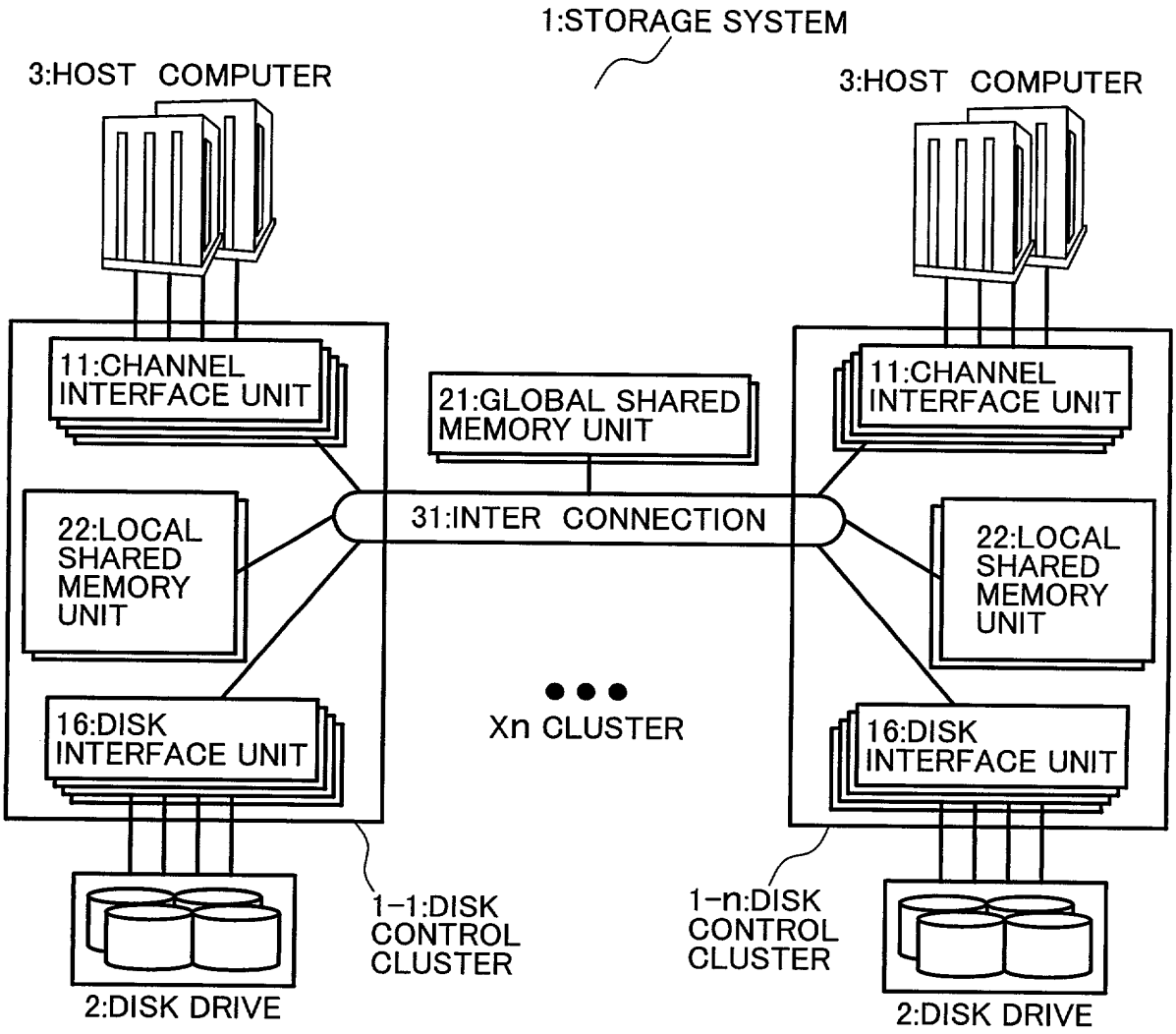
1:STORAGE SYSTEM
3:HOST COMPUTER
3:HOST COMPUTER
11:CHANNEL INTERFACE UNIT
21:GLOBAL SHARED MEMORY UNIT
11:CHANNEL INTERFACE UNIT
22:LOCAL SHARED MEMORY UNIT
31:INTER CONNECTION
22:LOCAL SHARED MEMORY UNIT
16:DISK INTERFACE UNIT
Xn CLUSTER
16:DISK INTERFACE UNIT
1-1:DISK CONTROL CLUSTER
1-n:DISK CONTROL CLUSTER
2:DISK DRIVE
2:DISK DRIVE

FIG.2

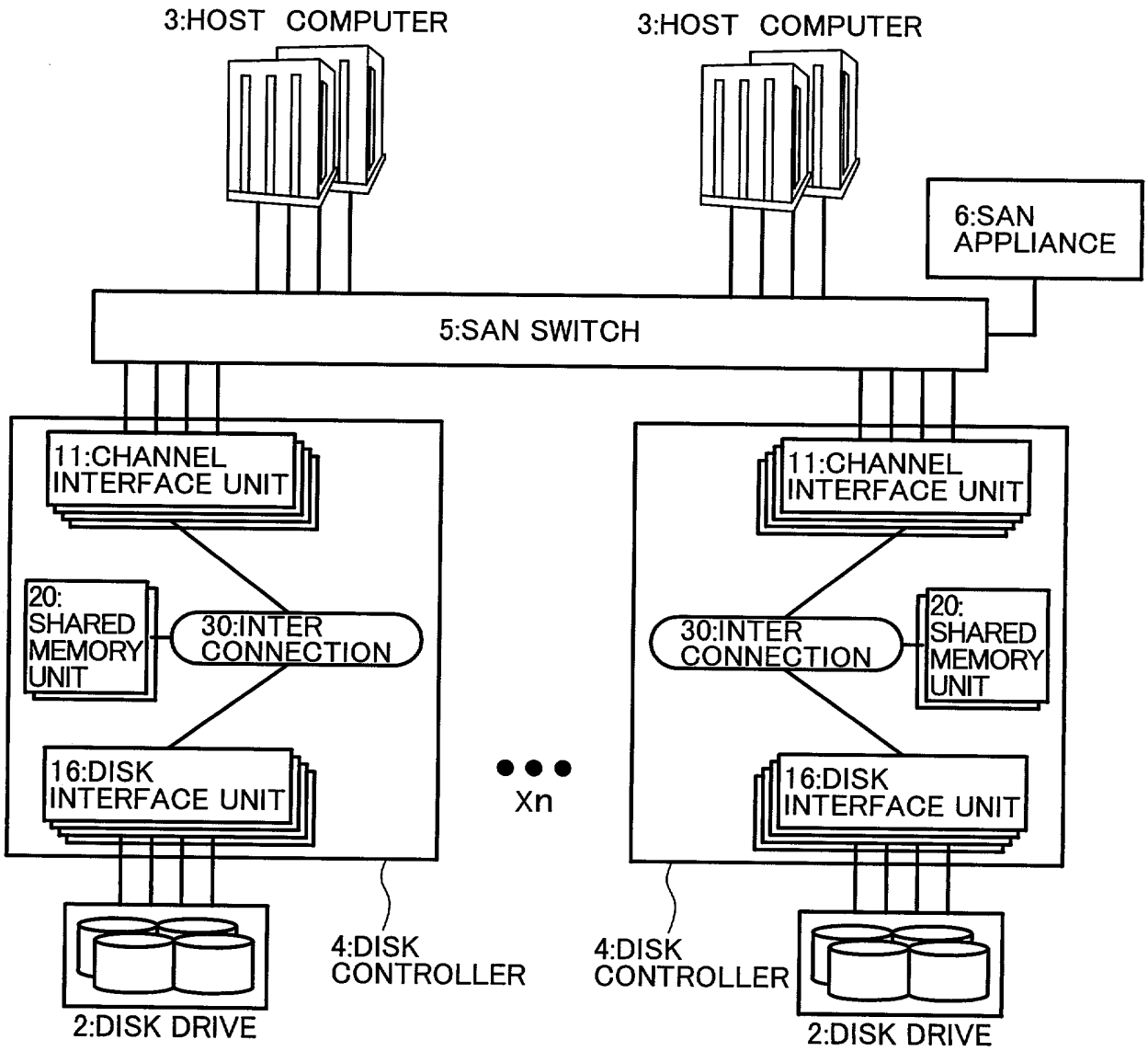
3:HOST COMPUTER
3:HOST COMPUTER
6:SAN APPLIANCE
5:SAN SWITCH
11:CHANNEL INTERFACE UNIT
20: SHARED MEMORY UNIT
30:INTER CONNECTION
16:DISK INTERFACE UNIT
Xn
11:CHANNEL INTERFACE UNIT
30:INTER CONNECTION
20: SHARED MEMORY UNIT
16:DISK INTERFACE UNIT
4:DISK CONTROLLER
4:DISK CONTROLLER
2:DISK DRIVE
2:DISK DRIVE

FIG.3

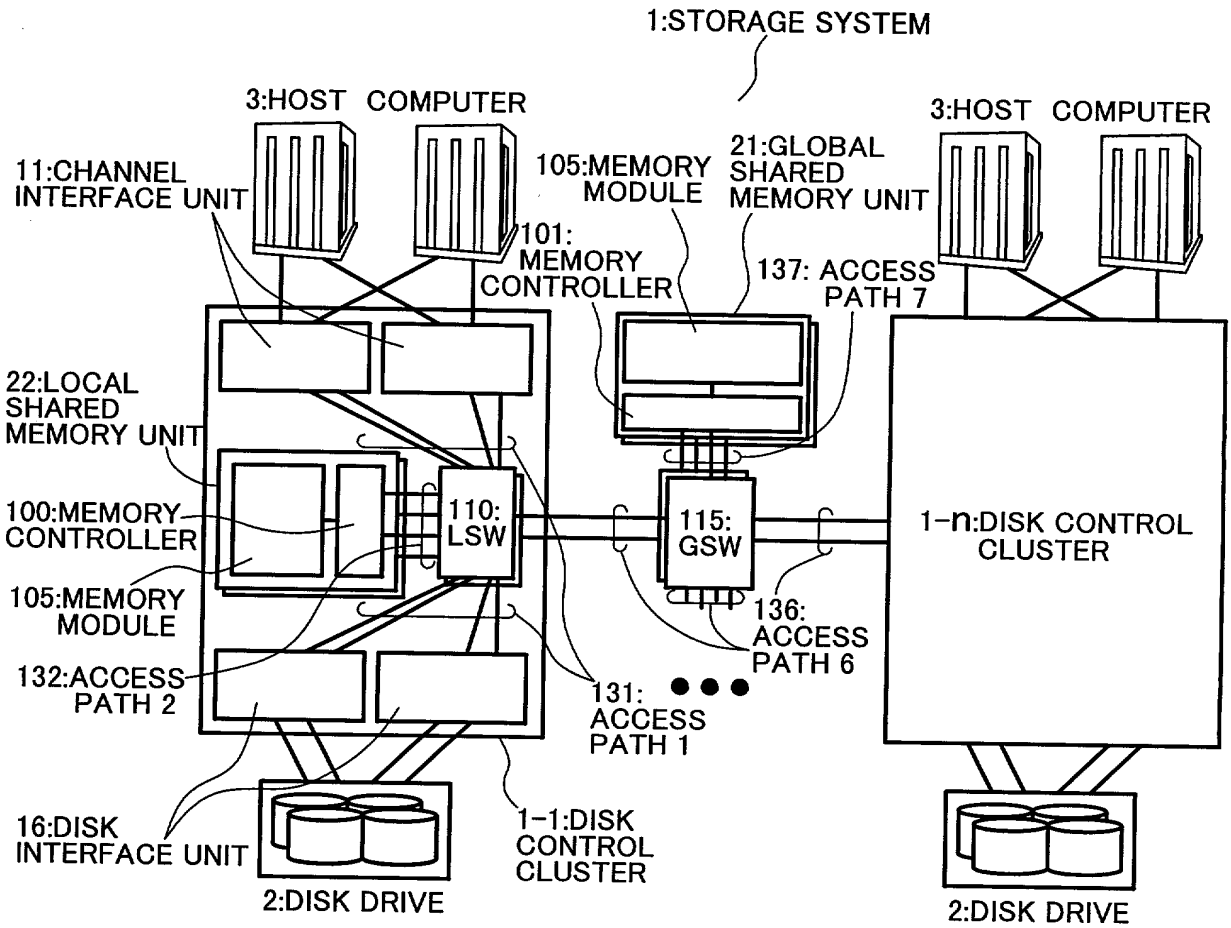
1:STORAGE SYSTEM
3:HOST COMPUTER
3:HOST COMPUTER
11:CHANNEL INTERFACE UNIT
105:MEMORY MODULE
21:GLOBAL SHARED MEMORY UNIT
101: MEMORY CONTROLLER
137: ACCESS PATH 7
22:LOCAL SHARED MEMORY UNIT
100:MEMORY CONTROLLER
110: LSW
115: GSW
1-n:DISK CONTROL CLUSTER
105:MEMORY MODULE
136: ACCESS PATH 6
132:ACCESS PATH 2
131: ACCESS PATH 1
16:DISK INTERFACE UNIT
1-1:DISK CONTROL CLUSTER
2:DISK DRIVE
2:DISK DRIVE

FIG.4

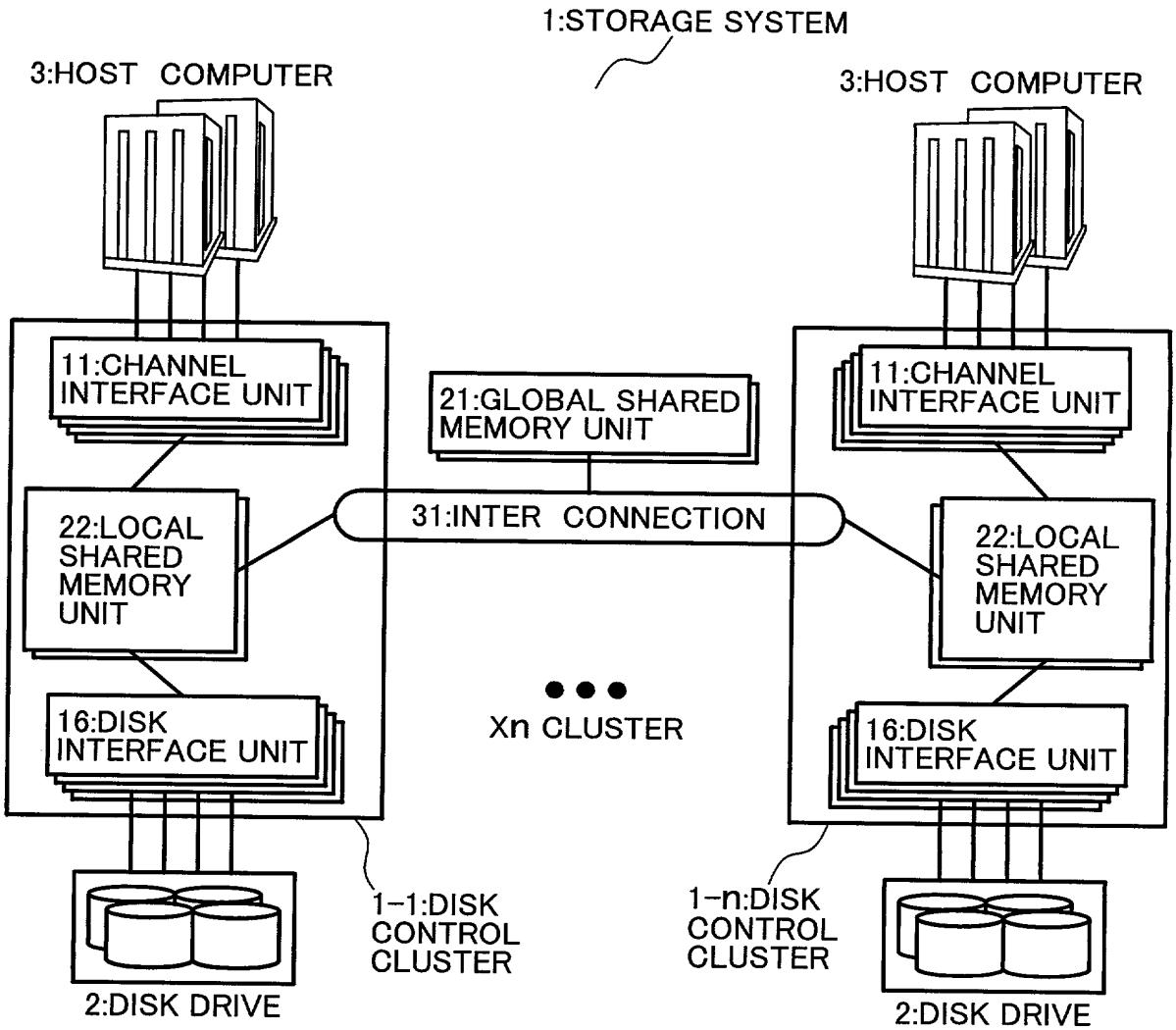
1:STORAGE SYSTEM
3:HOST COMPUTER
3:HOST COMPUTER
11:CHANNEL INTERFACE UNIT
21:GLOBAL SHARED MEMORY UNIT
11:CHANNEL INTERFACE UNIT
22:LOCAL SHARED MEMORY UNIT
31:INTER CONNECTION
22:LOCAL SHARED MEMORY UNIT
16:DISK INTERFACE UNIT
Xn CLUSTER
16:DISK INTERFACE UNIT
1-1:DISK CONTROL CLUSTER
1-n:DISK CONTROL CLUSTER
2:DISK DRIVE
2:DISK DRIVE

FIG.5

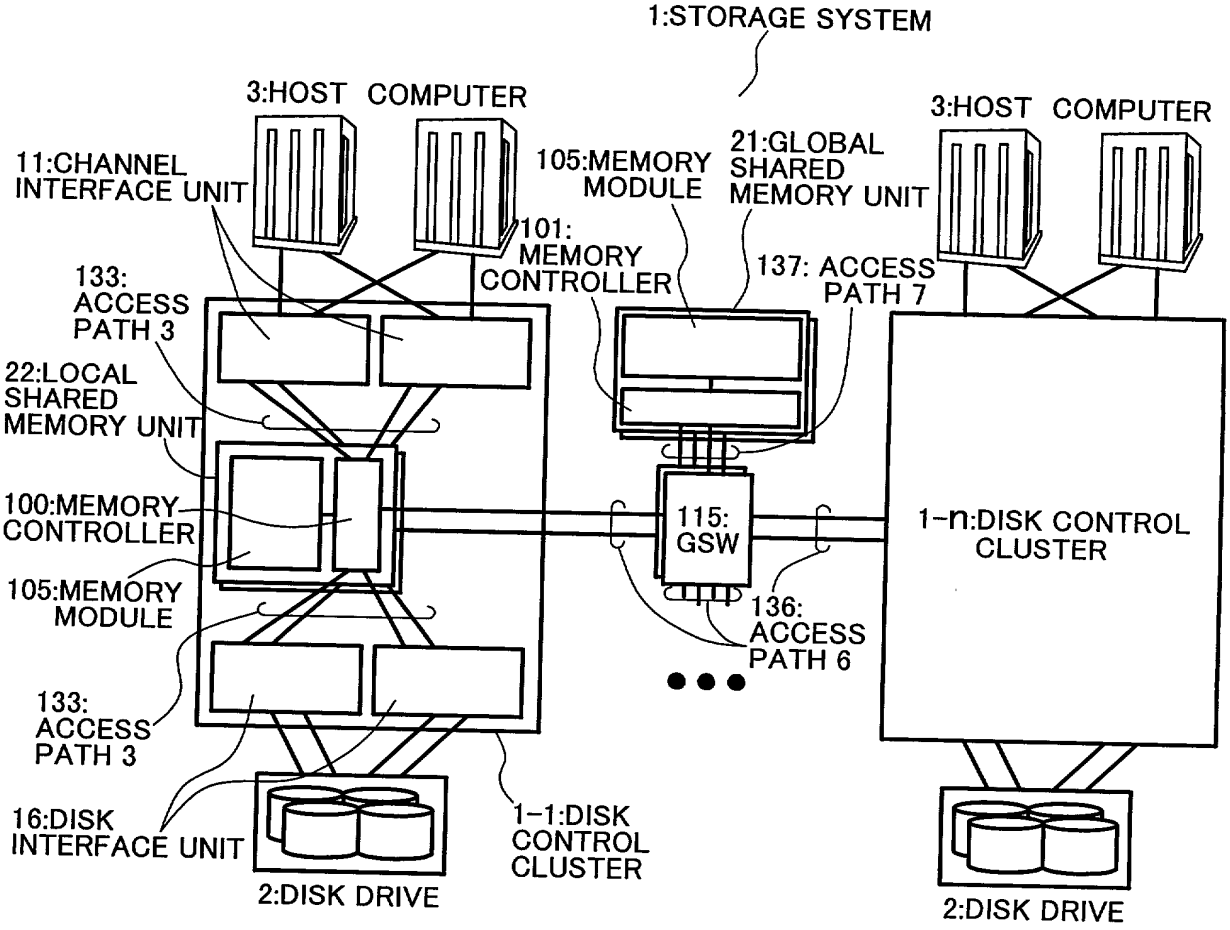
1:STORAGE SYSTEM
3:HOST COMPUTER
3:HOST COMPUTER
11:CHANNEL INTERFACE UNIT
105:MEMORY MODULE
21:GLOBAL SHARED MEMORY UNIT
101: MEMORY CONTROLLER
137: ACCESS PATH 7
133: ACCESS PATH 3
22:LOCAL SHARED MEMORY UNIT
100:MEMORY CONTROLLER
115: GSW
1-n:DISK CONTROL CLUSTER
105:MEMORY MODULE
136: ACCESS PATH 6
133: ACCESS PATH 3
16:DISK INTERFACE UNIT
1-1:DISK CONTROL CLUSTER
2:DISK DRIVE
2:DISK DRIVE

FIG.6

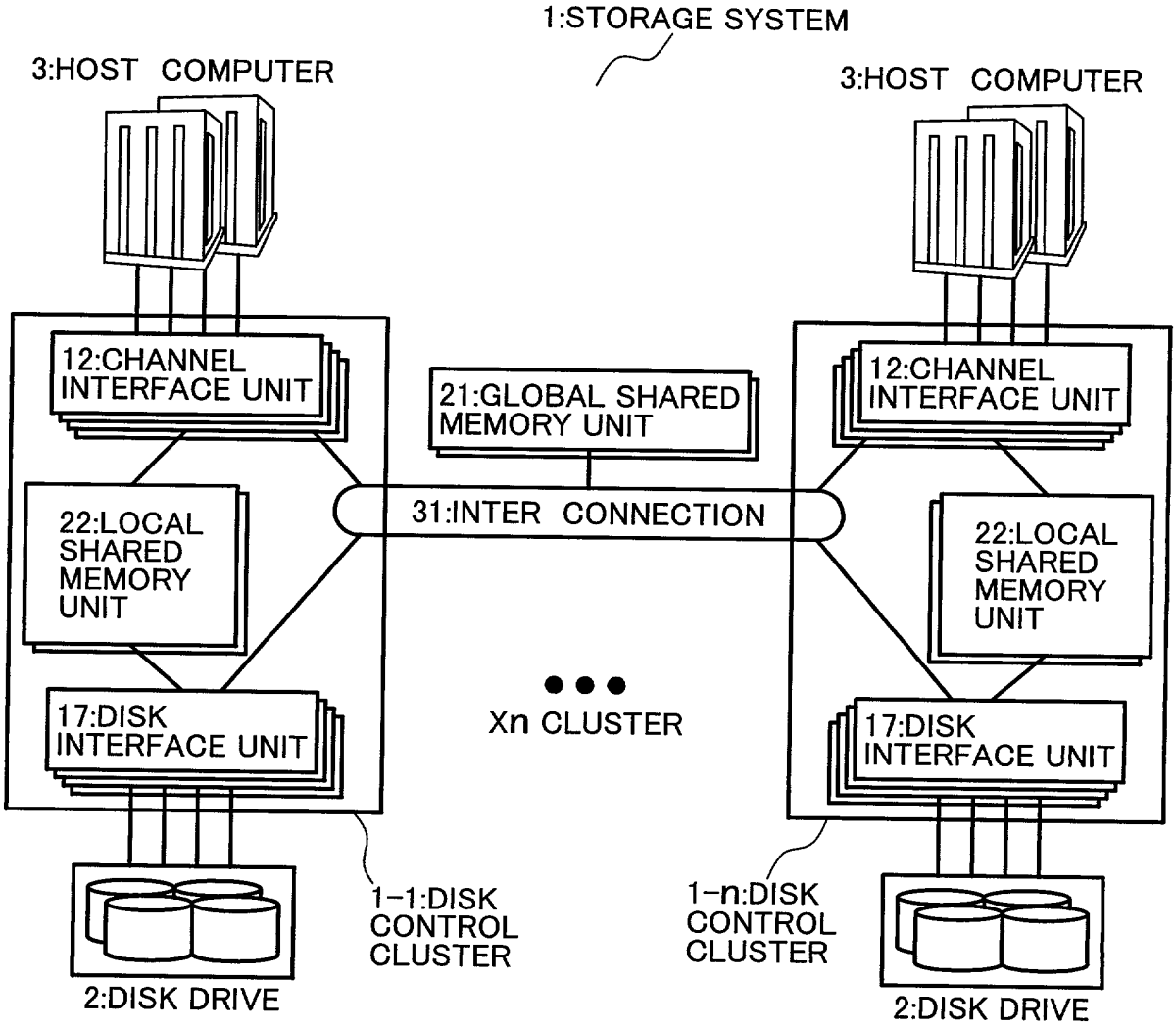
1:STORAGE SYSTEM
3:HOST COMPUTER
3:HOST COMPUTER
12:CHANNEL INTERFACE UNIT
21:GLOBAL SHARED MEMORY UNIT
12:CHANNEL INTERFACE UNIT
22:LOCAL SHARED MEMORY UNIT
31:INTER CONNECTION
22:LOCAL SHARED MEMORY UNIT
17:DISK INTERFACE UNIT
Xn CLUSTER
17:DISK INTERFACE UNIT
1-1:DISK CONTROL CLUSTER
1-n:DISK CONTROL CLUSTER
2:DISK DRIVE
2:DISK DRIVE

FIG.7

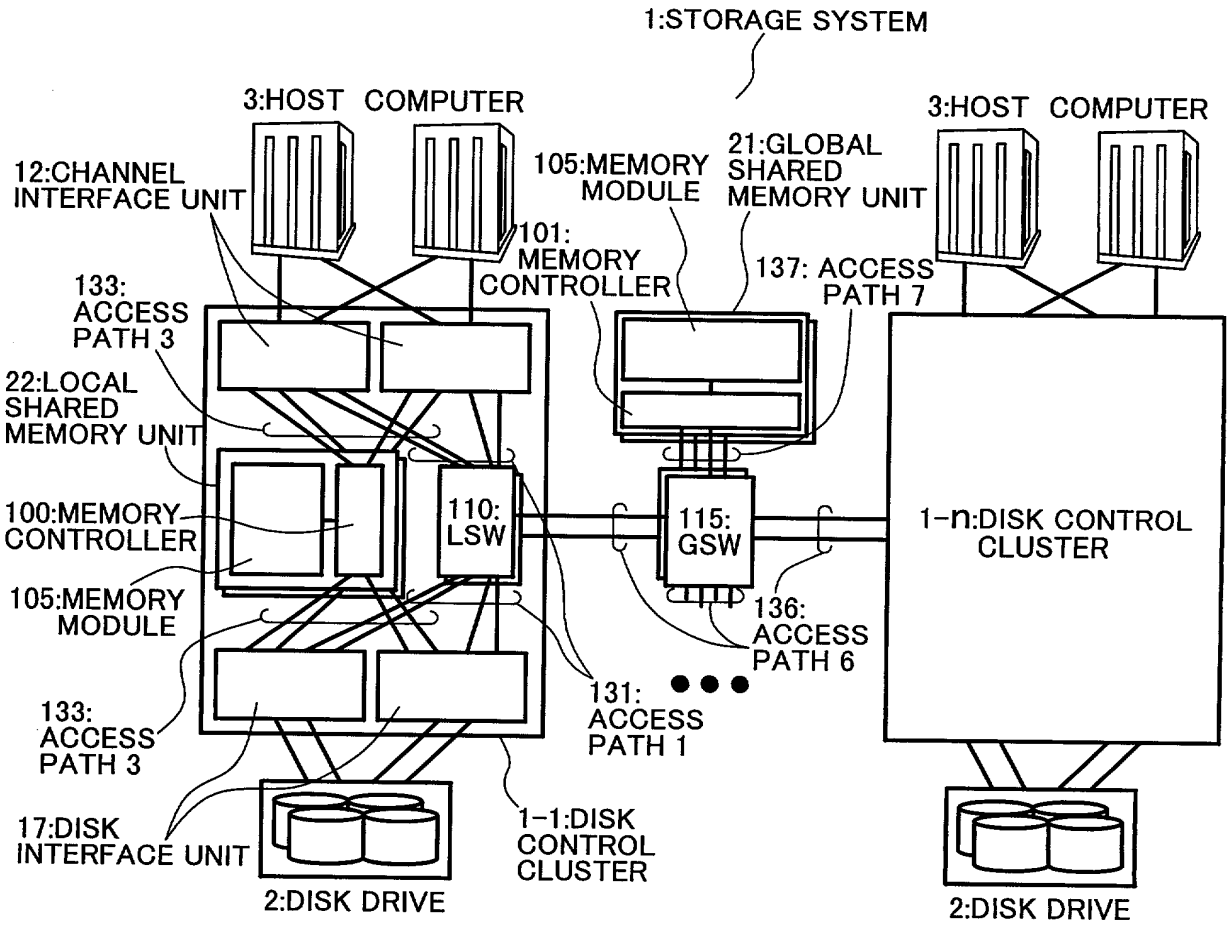
1:STORAGE SYSTEM
3:HOST COMPUTER
3:HOST COMPUTER
12:CHANNEL INTERFACE UNIT
105:MEMORY MODULE
21:GLOBAL SHARED MEMORY UNIT
101: MEMORY CONTROLLER
137: ACCESS PATH 7
133: ACCESS PATH 3
22:LOCAL SHARED MEMORY UNIT
100:MEMORY CONTROLLER
110: LSW
115: GSW
1-n:DISK CONTROL CLUSTER
105:MEMORY MODULE
136: ACCESS PATH 6
131: ACCESS PATH 1
133: ACCESS PATH 3
17:DISK INTERFACE UNIT
1-1:DISK CONTROL CLUSTER
2:DISK DRIVE
2:DISK DRIVE

FIG.8

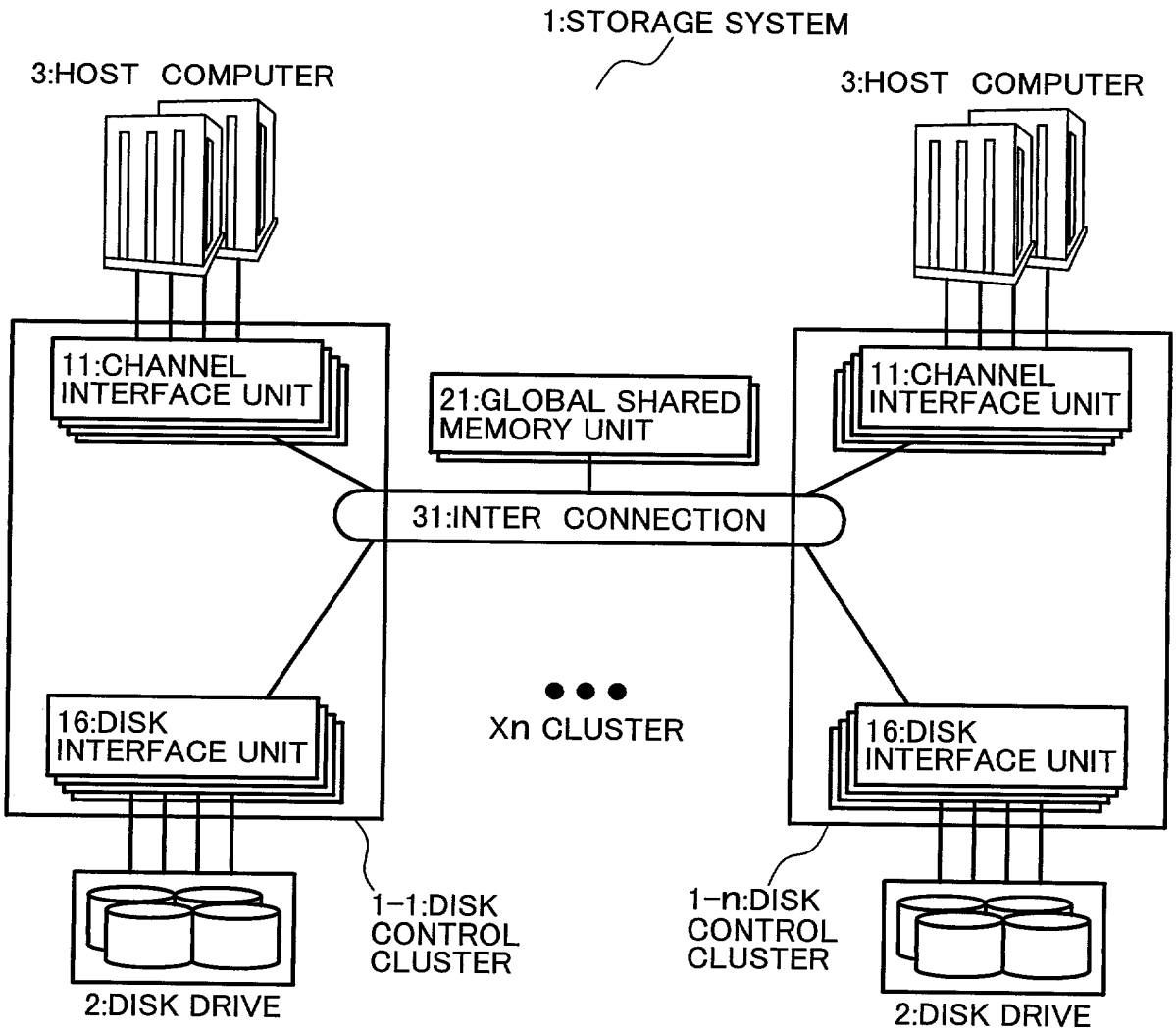
1:STORAGE SYSTEM
3:HOST COMPUTER
3:HOST COMPUTER
11:CHANNEL INTERFACE UNIT
21:GLOBAL SHARED MEMORY UNIT
11:CHANNEL INTERFACE UNIT
31:INTER CONNECTION
16:DISK INTERFACE UNIT
Xn CLUSTER
16:DISK INTERFACE UNIT
1-1:DISK CONTROL CLUSTER
1-n:DISK CONTROL CLUSTER
2:DISK DRIVE
2:DISK DRIVE

FIG.9

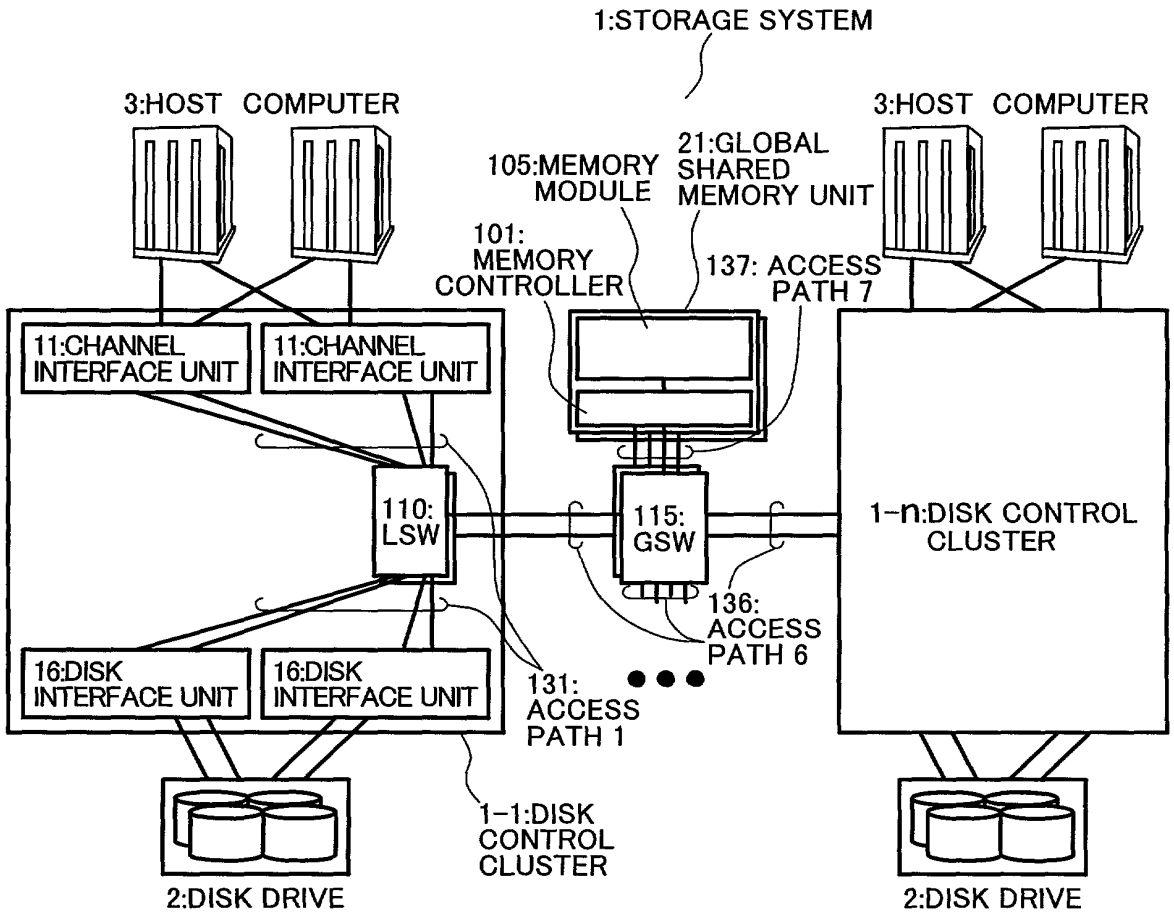
1:STORAGE SYSTEM
3:HOST COMPUTER
3:HOST COMPUTER
105:MEMORY MODULE
21:GLOBAL SHARED MEMORY UNIT
101: MEMORY CONTROLLER
137: ACCESS PATH 7
11:CHANNEL INTERFACE UNIT
11:CHANNEL INTERFACE UNIT
110: LSW
115: GSW
1-n:DISK CONTROL CLUSTER
136: ACCESS PATH 6
16:DISK INTERFACE UNIT
16:DISK INTERFACE UNIT
131: ACCESS PATH 1
1-1:DISK CONTROL CLUSTER
2:DISK DRIVE
2:DISK DRIVE

FIG.10

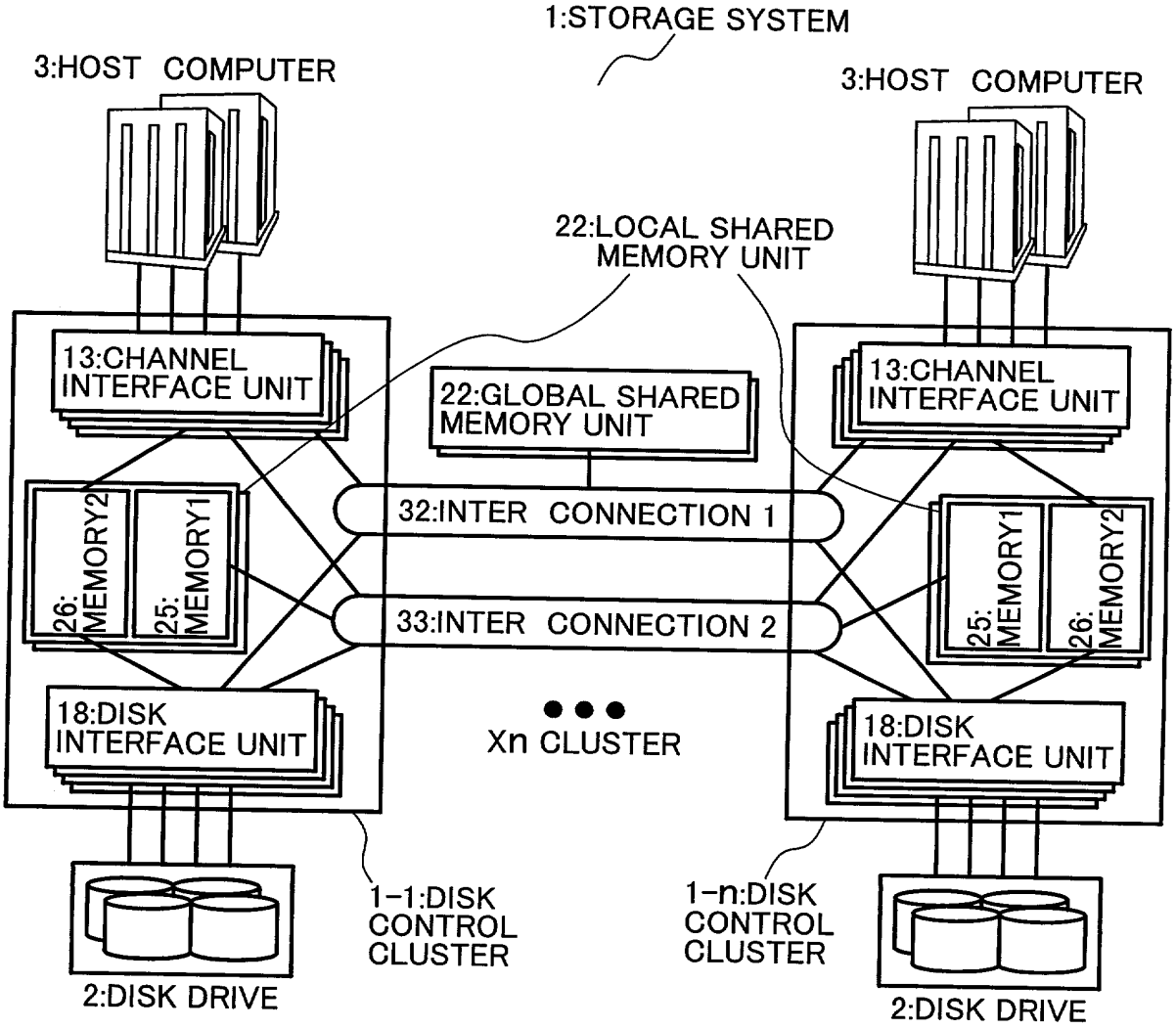
1:STORAGE SYSTEM
3:HOST COMPUTER
3:HOST COMPUTER
22:LOCAL SHARED MEMORY UNIT
13:CHANNEL INTERFACE UNIT
22:GLOBAL SHARED MEMORY UNIT
13:CHANNEL INTERFACE UNIT
32:INTER CONNECTION 1
26: MEMORY2
25: MEMORY1
33:INTER CONNECTION 2
25: MEMORY1
26: MEMORY2
18:DISK INTERFACE UNIT
Xn CLUSTER
18:DISK INTERFACE UNIT
1-1:DISK CONTROL CLUSTER
1-n:DISK CONTROL CLUSTER
2:DISK DRIVE
2:DISK DRIVE

FIG.11

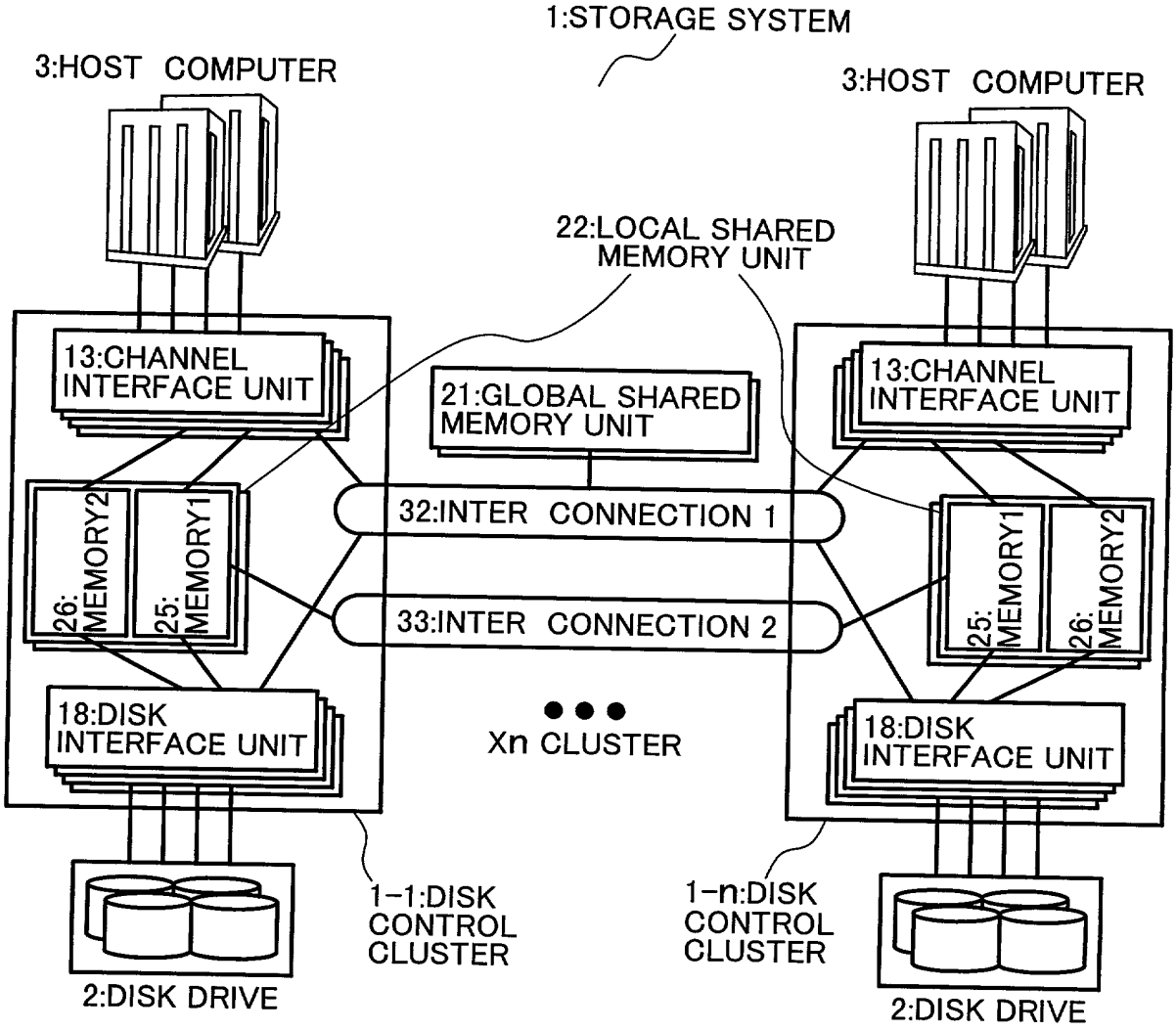
1:STORAGE SYSTEM
3:HOST COMPUTER
3:HOST COMPUTER
22:LOCAL SHARED MEMORY UNIT
13:CHANNEL INTERFACE UNIT
21:GLOBAL SHARED MEMORY UNIT
13:CHANNEL INTERFACE UNIT
26: MEMORY2
25: MEMORY1
32:INTER CONNECTION 1
25: MEMORY1
26: MEMORY2
33:INTER CONNECTION 2
18:DISK INTERFACE UNIT
Xn CLUSTER
18:DISK INTERFACE UNIT
1-1:DISK CONTROL CLUSTER
1-n:DISK CONTROL CLUSTER
2:DISK DRIVE
2:DISK DRIVE

FIG.12

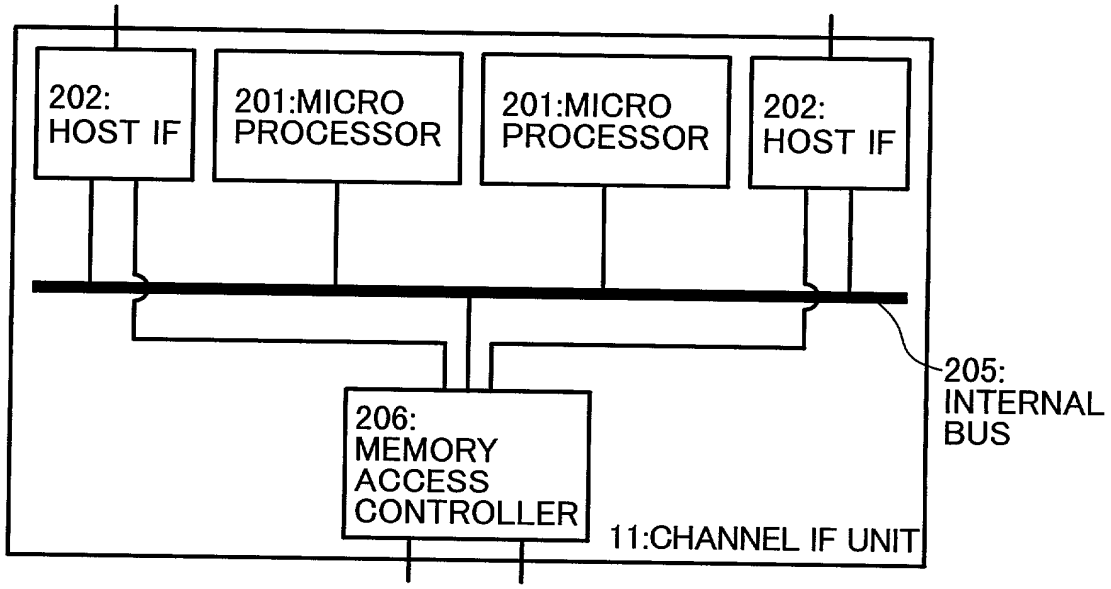
202:
HOST IF
201:MICRO
PROCESSOR
201:MICRO
PROCESSOR
202:
HOST IF
205:
INTERNAL
BUS
206:
MEMORY
ACCESS
CONTROLLER
11:CHANNEL IF UNIT

FIG.13

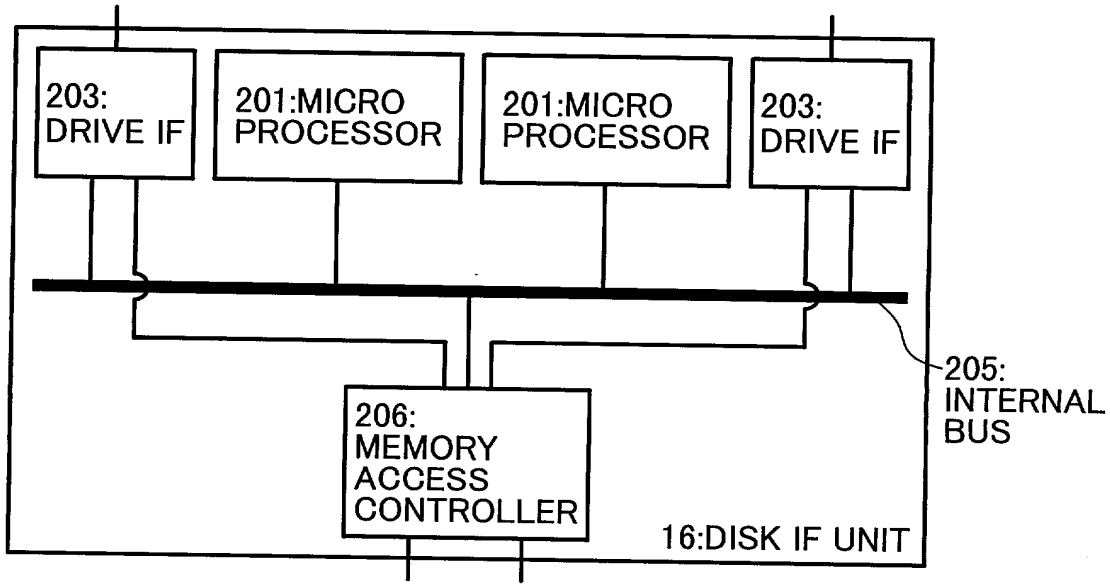
203:
DRIVE IF
201:MICRO
PROCESSOR
201:MICRO
PROCESSOR
203:
DRIVE IF
205:
INTERNAL
BUS
206:
MEMORY
ACCESS
CONTROLLER
16:DISK IF UNIT

FIG.14

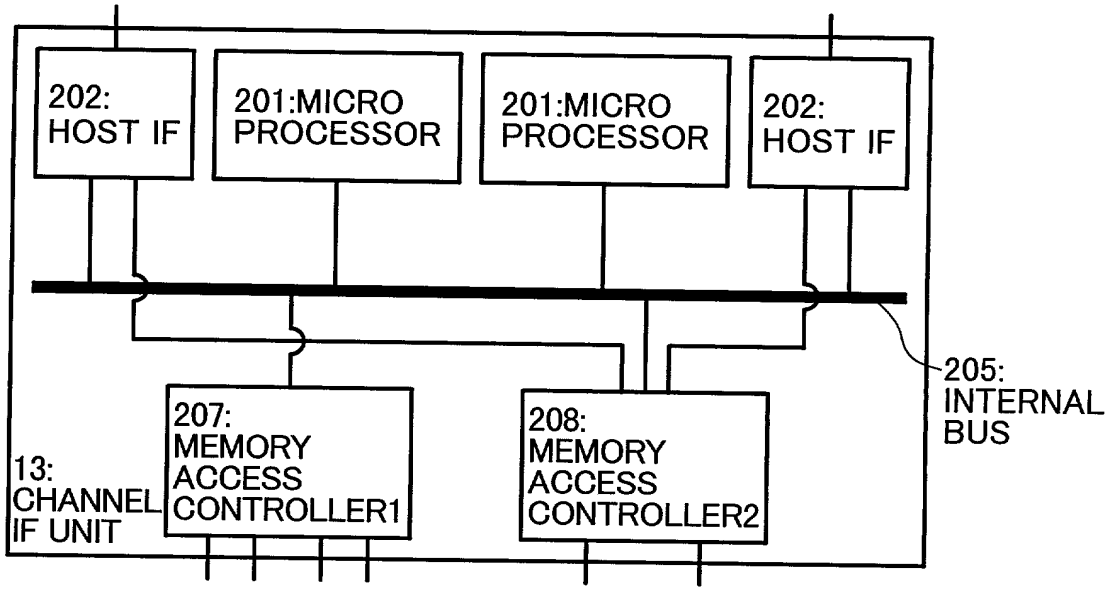
202:
HOST IF
201:MICRO
PROCESSOR
201:MICRO
PROCESSOR
202:
HOST IF
205:
INTERNAL
BUS
207:
MEMORY
ACCESS
CONTROLLER1
208:
MEMORY
ACCESS
CONTROLLER2
13:
CHANNEL
IF UNIT

FIG.15

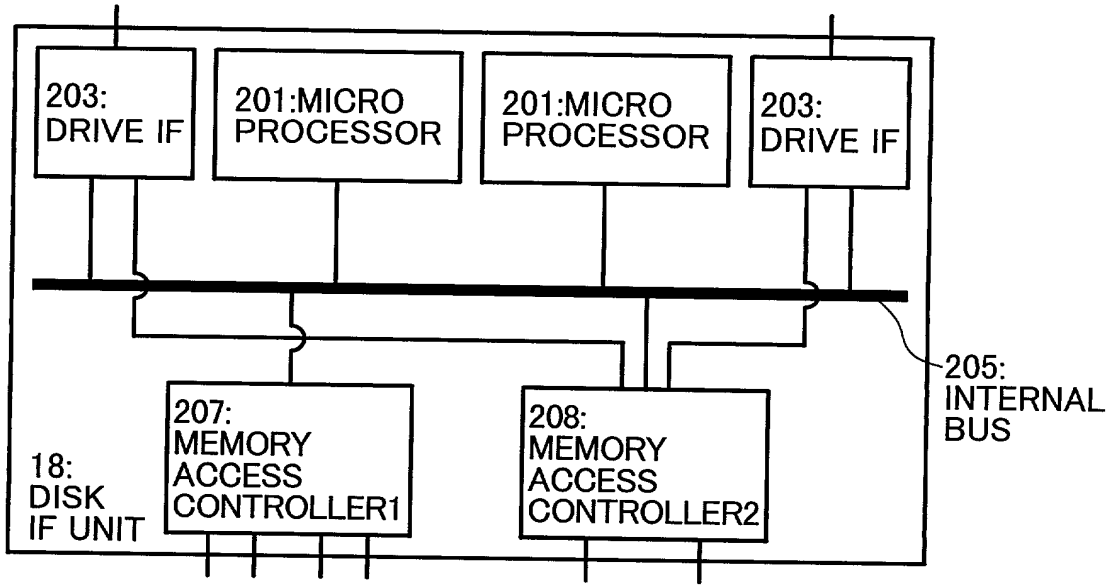
203:
DRIVE IF
201:MICRO
PROCESSOR
201:MICRO
PROCESSOR
203:
DRIVE IF
205:
INTERNAL
BUS
207:
MEMORY
ACCESS
CONTROLLER1
208:
MEMORY
ACCESS
CONTROLLER2
18:
DISK
IF UNIT

FIG.16

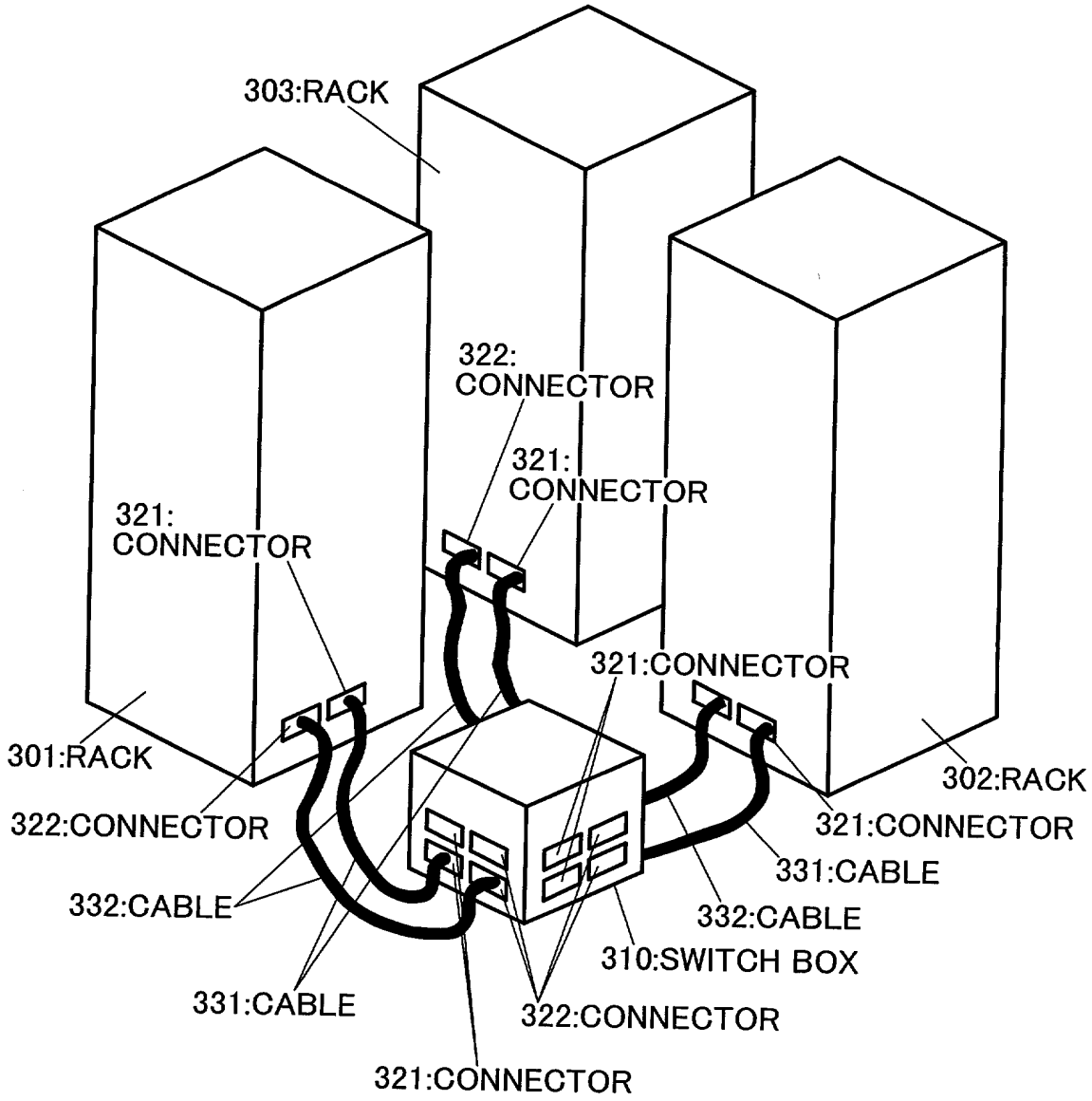
303:RACK
322:
CONNECTOR
321:
CONNECTOR
321:
CONNECTOR
321:CONNECTOR
301:RACK
302:RACK
322:CONNECTOR
321:CONNECTOR
331:CABLE
332:CABLE
332:CABLE
310:SWITCH BOX
331:CABLE
322:CONNECTOR
321:CONNECTOR

FIG.17

(BEFORE AN INCREASE OF A CLUSTER)

401 GSW PORT NUMBER	402 CLUSTER NUMBER
0	0
1	1
2	3
3	2
4	NOT-CONNECTED
5	4
6	NOT-CONNECTED
7	NOT-CONNECTED

400:CORRESPONDING TABLE BETWEEN A GSW PORT AND A CLUSTER NUMBER

(AFTER AN INCREASE OF A CLUSTER)

401 GSW PORT NUMBER	402 CLUSTER NUMBER
0	0
1	1
2	3
3	2
4	5
5	4
6	NOT-CONNECTED
7	NOT-CONNECTED

400:CORRESPONDING TABLE BETWEEN A GSW PORT AND A CLUSTER NUMBER

FIG.18

(BEFORE AN INCREASE OF A CLUSTER)

402 CLUSTER NUMBER	406 LOGICAL VOLUME NUMBER
0	0～4095
1	4096～6143
2	12288～16383
3	6144～12287
4	16384～16639
5	NOT-CONNECTED
6	NOT-CONNECTED
7	NOT-CONNECTED

405:CORRESPONDING TABLE BETWEEN A CLUSTER NUMBER AND A LOGICAL VOLUME NUMBER

(AFTER AN INCREASE OF A CLUSTER)

402 CLUSTER NUMBER	406 LOGICAL VOLUME NUMBER
0	0～4095
1	4096～6143
2	12288～16383
3	6144～12287
4	16384～16639
5	16640～20735
6	NOT-CONNECTED
7	NOT-CONNECTED

405:CORRESPONDING TABLE BETWEEN A CLUSTER NUMBER AND A LOGICAL VOLUME NUMBER